AMS-02 Weekly Activity Report, October 07, 2005

Upcoming Events:

- STA Vacuum Case Delivery (on dock at STADCO) – Date TBD (subject to weld inspection and review)
- AMS-02 Phase II Safety Data Package to the Collaboration for review – October 12, 2005
- AMS-02 General Technical Interchange Meeting (TIM) @ CERN – October 24-28, 2005 – Geneva
- Modal & Static Test Meeting @ IABG – October 31, 2005 – Munich, Germany
- Sine Sweep Test Meeting – November 2, 2005 – INFN, Terni, Italy
- ACOP Critical Design Review (CDR) – November 15, 2005
- ACOP Phase II Safety Review – December 13, 2005
- AMS-02 Phase II Safety Review – Date TBD (Schedule under review) – JSC

Upcoming Tests:

- Interface Plate Static Test – Date TBD – Location TBD
- Lower Joint Static Test – Date TBD – Location TBD
- STA Sine Sweep Test – Schedule under review – INFN, Terni, Italy
- STA Acoustic Test – Schedule under review – ESTEC, Noordwijk, Netherlands
- Full Assembly Modal & Static Tests – Schedule under review – IABG, Munich, Germany

General:

- A preliminary draft of the AMS-02 Phase II Safety Data Package (SDP) was completed and delivered to the NASA AMS Project Manager and Deputy Project Manager. Preparations are in work to submit the SDP to the AMS Configuration Control Board (CCB) to initiate a formal review of the document.

USS-02 and GSE:

- Work is continuing on the design for the retractable Remotely Operated Electrical Umbilical (ROEU) with emphasis on methods for attaching the cables. Preliminary models are complete. It is likely that a test will be required to determine the EVA activation loads for retraction of the ROEU. These loads will be a function of the unsupported cable length and the bundle diameter.

- The drawing for the Vacuum Case (VC) Outer Cylinder Thermal Blanket Bracket was completed and returned to Checking. The design for an additional bracket for the Conical Flange was completed and the fabrication drawing is in work.

- The Thermal Blanket layout for the VC Outer Cylinder was finalized. The assembly drawing for installing the blankets is approximately 50 percent complete. Additional mounting details are being added for the Conical Flange blankets.

- STL files for rapid prototyping models have been developed and sent to EC2/Thermal Systems and Engineering Support Branch design personnel. Softgoods personnel will use these models to develop a template for the blanket mounting holes.

- Preliminary tube models for the Tracker Thermal Control System (TTCS) were provided to design personnel. Further development of the design is required before installation issues are addressed.

- The Unique Support Structure – 02 (USS-02) Build-up Procedure document was checked and redlines were incorporated.

- The Lower USS-02 assembly piece parts were assembled on the Assembly Fixture.

- Two 5/8 inch bolts that were installed in the USS-02 build-up assembly galled. While installing the bolts the running torque exceeded the maximum allowable for the bolt (300 IN-LBS). The assembly was halted until engineering determines the cause of the problem. A test set-up was fabricated with the same lot of inserts installed in a block of the same aluminum alloy used in the assembly. Two bolts, one used in the build-up assembly and the other the same specification used for flight, were treaded into the inserts and the running torque was recorded at approximately 150 IN-LBS and 180 IN-LBS respectively. Further inspection of the bolts found indications of rubbing on the shank of the galled bolts. Engineering now suspects that the joint with the insert moved during installation causing the bolt to rub on the side of the thru hole in mating part. The current plan of action is to verify the running torque on at least one insert on the flight hardware prior to installation. If it is within range then the hardware will be reassembled on the fixture and clamped to it to prevent movement during bolt installation.

- Assembly of the Vacuum Case Test Fixture (VCTF) and installation into the shipping crate was supported in the Bldg 10 Shop. Shipping of the VCTF for final machining is on hold pending the stress analysis of the attachment points for the transition frames.

- Final dispositions were written and signatures were obtained to close two Discrepancy Reports (DRs) written against the VCTF. An interim DR was generated to remove constraints for shipping the VCTF and further processing of the hardware.

- The Sill Joints were returned from metal finishing. The Trunnion holes are undersized due excessive nickel plate thickness. The Trunnion Pins will be fit checked to determine which, if any will fit in the discrepant holes.

- Vendors were contacted to investigate alternative materials for the transition frames. An alternate material is required due to the negative margins on the frames. Material properties were obtained and provided to Stress personnel for further analysis.

- A second alignment pin on one of the VCTF columns was broken during an attempt to remove the Upper Frame. The Upper Frame was being repositioned after it was discovered that it had been assembled 180 degrees off. The pins used are Unbrako from SPS Technologies and have a spiral groove cut into the surface. The column was removed and work is in progress to remove the broken pin. A new identical pin will be installed for the full assembly machining operations. Once complete, all of the alignment pins currently installed will be removed and replaced with a stronger tapered pin that will minimize the chances of breaking a pin during assembly.

- A drawing was created for the new VCTF tapered alignment pin and submitted for formal check.

- High resolution pictures of the USS-02 Build-up Assembly were taken to document the assembly.

- A drawing for a Shim for the USS-02 was created and fabrication released.

- The drawings for the Primary Support Stand (PSS) were submitted for checking.

- Inserts are being installed in the PSS Column Extension.

- Diagonal Sill brackets were final inspected and issued 911 tags.

- The PSS Columns were inspected and issued red 911 tags due to some minor discrepancies.

- One of the PSS Sliding Frames was dimensionally inspected.

Vacuum Case:

- Work is continuing on the ultrasonic inspections of the VC upper weld. This work is being performed at STADCO by ESCG personnel. The upper weld UT inspection is complete for both the 0 degree and 60 degree orientations. Analysis of the results is in work.

- The large indication that showed up around a start/stop location was positioned outside of the weld in the base metal. It is a surface break, possible gouge, and there is a thickness reduction of ~.020. This was possibly due to the scraping cleaning process but analysis is still not complete. This will not be a weld repair but the exact shape and size of the indication will be documented. (NOTE: If this is from the scraping process, we need to re-evaluate how this is done and how to inspect the surface after the scraping process is complete to make sure to process was only on the weld surface.)

- Based on this first inspection, the sensitivity of the scan can be reduced which will “throw” out indications already recorded for the upper weld. The remaining indications will need to be evaluated to determine if repairs are necessary. The reduced sensitivity will also

help speed up the inspection of the lower weld since the smaller indications will not be picked up by the sensor.

- The use of the semi-automatic system for the 0 degree has not been repeatable in regards to the results from the manual operation due to the higher sensitivity. It is not sensitive enough based on the current setup. With the reduced sensitivity, the semi-automatic might work for the 0 degree. Work is in progress.

- The effort to complete the design of the Outer Cylinder rib protector is in work. The final design is expected to be completed by October 11.

- A TPS MOD was generated to close the VC lift TPS that was used to raise the VC in preparation for Hurricane Rita.

Sine Sweep Test:

- Drawings for installation of the VC/VCTF onto the slip table at INFN are in work and being updated.

Avionics:

- ESCG personnel supported the AMS-02 Technical Electronics Meeting at the Chung Shan Institute of Science and Technology (CSIST) in Taiwan the week of September 26 – 30. Presentations were made to the meeting regarding Uninterruptible Power Supply (UPS) and Cryomagnet Dump Diode (CDD) development / fabrication / test status. Working group meetings with the CSIST UPS and CDD teams were supported. Specific items included UPS manufacture and assembly / integration details, as well as UPS and CDD testing. AMS-02 Crew Operations Post (ACOP) working group meetings were also supported. Specific items included engineering model manufacture and assembly / integration details, as well as Critical Design Review (CDR) preparations. The ACOP CDR will be held at Jacobs in Houston the week of November 16, 2005.

Structures:

- Analysis for the components that make up the Keel Assembly is fully updated and complete. The Lower USS-02 Assembly components analysis is almost complete with only two components remaining to be documented.

- The bolt GAP element analysis will begin this week to output the faster loads of the Lower Support Ring interface to the Outer Cylinder. The pre-analysis necessary to assess the loads in these fasteners has been completed.

- Work is currently underway to determine the current mass of all of the AMS-02 components. The updated estimates will be incorporated into the latest FEM of the overall AMS-02 payload. A full static loads run will be conducted once this process has been completed.